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JAPANESE [JP,3035136,U]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

* NOTICES *

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CLAIMS

[Utility model registration claim]
[Claim 1] The medium opposed face by the side of the magnetic disk of the body of a slider is equipped with two or more positive pressure generating sections for a magnetic-head core coming [the inside of the tabular body of a slider]. The 1st negative pressure generating section is formed in the posterior part side of the 1st connection section. 1st 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider among these positive pressure generating sections connects by the 1st connection section — having — this — And the magnetic-head slider characterized by the direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider having the include angle.
[Claim 2] The magnetic-head slider according to claim 1 characterized by said two or more positive pressure generating sections consisting of the 2nd 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of [1 to prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider] the posterior part of the 1st positive pressure generating section and body of a slider.
[Claim 3] The magnetic-head slider according to claim 2 characterized by the 1st positive pressure generating section and the 2nd positive pressure generating section which adjoin each other along with the edges-on-both-sides section of the body of a slider being connected by the 2nd connection section, respectively.
[Claim 4] The magnetic-head slider according to claim 1 to 3 characterized by the include angle which a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider makes being 5 - 60 degrees.

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DETAILED DESCRIPTION

[Detailed explanation of a design]
[0001]
[The technical field to which a design belongs]
This design is related with the magnetic-head slider which enabled it to stabilize especially a surfacing property about the magnetic-head slider which surfaces a magnetic-recording medium top at minute spacing, and performs record playback of magnetic information.
[0002]
[Description of the Prior Art]
Conventionally, in the magnetic recording medium for computers, the magnetic disk drive as shown in drawing 7 is known.
This magnetic disk drive is the configuration that opposite arrangement of the magnetic head 2 was carried out on the disc-like magnetic disk 1 formed free [rotation], and the magnetic head 2 is supported by the support arm 4 through the 3 square-shape-like leaf 3, and it is constituted so that the magnetic head 2 can move to the location of a request of the diameter direction of a magnetic disk 1 by rotation actuation centering on rotation core 4a of the support arm 4.
[0003]
When the magnetic disk 1 has stopped in the magnetic disk drive of a configuration of being shown in drawing 7 , When the base of the magnetic head 2 is lightly forced on the magnetic disk 1 by the energization force of the leaf 3 which supports the magnetic head 2 and the magnetic disk 1 is rotating If the magnetic head 2 is constituted so that surfacing transit of the magnetic-disk 1 top may be carried out in predetermined height, and rotation of a magnetic disk 1 is suspended using the flow of the air produced with rotation, again, the magnetic head 2 which was carrying out surfacing transit will contact a magnetic disk 1, and will be stopped. And it is constituted so that R/W of magnetic information may be made to the magnetic-recording layer of a magnetic disk 1 at the time of the aforementioned surfacing transit, and this actuation situation of a series of is usually called CSS (contact start stop).
[0004]
Drawing 8 and drawing 9 are what shows the surfacing run state of the magnetic head 2 of 2 rail molds used widely now. In the base of this magnetic head 2 One slot 5 is formed in a center section, and side rails 6 and 6 are formed in the both sides. To the tip inferior-surface-of-tongue side (improvement style side in the method of rotation of a magnetic disk 1) of each side rail 6 Inclined plane 6a is formed, the base of the side rail 6 of the magnetic head 2 serves as the positive pressure generating section because air flows as shown in the arrow head A of drawing 8 through this inclined plane 6a, and the magnetic head 2 carries out surfacing transit.
Moreover, as the two-dot chain line of drawing 8 shows, negative pressure slot 6b is formed in the base of a side rail 2, and the configuration of the magnetic head aiming at stabilization of surfacing performance traverse is also known by balancing the negative pressure generated in this negative pressure slot 6b, the positive pressure generated in said side rails 6 and 6, and a spring pressure.
[0005]
By the way, although the condition as which drawing 8 regarded the magnetic head 2 from the

side-face side, and the condition that drawing 9 looked at the magnetic head 2 from the posterior part side are shown Since air flows into the base side of the magnetic head 2 through inclined plane 6a when the magnetic head 2 is carrying out surfacing transit, The magnetic head 2 is carrying out surfacing transit, carrying out the minute include-angle inclination of the airstream close side in the condition of having raised upwards, as shown in drawing 8 , and, generally whenever [this tilt-angle] is called the pitch angle (alpha : usually 100-500microRad extent). Moreover, as shown in drawing 9 , when the magnetic head 2 of a surfacing run state is seen from a posterior part, the include angle toward which the magnetic head 2 inclines right and left is called the roll angle (beta).
Although the center line (it passes along the core of the magnetic head 2, and is a line parallel to the side face of the magnetic head 2) a of the magnetic head 2 and the tangent b of the magnetic disk 2 which passes the center line part of the magnetic head 2 will not be in agreement on the other hand when the magnetic head 2 moves to a location as shown by sign 2' of drawing 7 by rotation of the support arm 4, the include-angle gap in this case is called the angle of skew (gamma).
And the pitch angle and the roll angle are used as one standard of transit stability.
[0006]
If it is in the magnetic head 2 of the above configurations Since it is more advantageous for the magnetic head 2 to approach the magnetic-recording layer of a magnetic disk 1 if it sees from the field of magnetic recording Since it is necessary to make it the magnetic head 2 not collide with detailed foreign matters, such as dust on a magnetic disk 1, if it is desirable to make the height at the time of surfacing transit as low as possible and it sees from stabilization of surfacing performance traverse, and the field of dependability There is a conflicting requirement as it is desirable to make the height at the time of surfacing transit as high as possible, in the present condition, the blending point of this conflicting requirement is taken and surfacing height is set up.
[0007]
However, in a magnetic disk 1, since peripheral speed differs and the air contents which flow into the pars-basilaris-ossis-occipitalis side of the magnetic head 2 also differ, the surfacing height of the magnetic head 2 will differ by the inner circumference [of a magnetic disk 1], and periphery side at a periphery and periphery section side. And there is a problem to which the positive pressure generated in two side rails 6 of the magnetic head 2 comes to differ, these influence complexly, and gap flying height and pitch angle alpha and roll angle beta of the magnetic head 2 become unstable by rotation of the support arm 4 since angle-of-skew gamma of the magnetic head 2 differs by the inner circumference [of a magnetic disk 2] and periphery side.
[0008]
Even if it is the case where angle-of-skew gamma of the magnetic head 2 changes from the above backgrounds Namely, although a pitch angle and a roll angle have little effect and to develop the magnetic head which can secure the stable flying height is desired even if the magnetic head moves to which part by the side of the inner circumference of a magnetic disk, and a periphery If it was in the magnetic head 2 of the structure of having two, about the conventional side rail 6, there was a fault from which the flying height, a roll angle, and a pitch angle change sensitively to change of an angle of skew.
[0009]
Then, conventionally, U character-like the rail section, a slot, etc. are formed in the base central site of the magnetic head other than the positive pressure generating section which is mainly concerned with a side rail, the negative pressure generating section is formed, and the magnetic head of the structure which was going to balance positive pressure and negative pressure skillfully and was going to stabilize the surfacing run state is known.
This kind of magnetic head can be seen to JP,6-44719,A, JP,6-124562,A, JP,6-195916,A, JP,6-215516,A, etc.
However, even if it was in the magnetic head concerning these patents, when the atmospheric pressure of the location in which the magnetic head is prepared was low (i.e., when used in the

state of low voltage by the effect of the difference in elevation of an installation), there was a possibility of producing lack at transit stability, for example.
[0010]
[Problem(s) to be Solved by the Device]
While the flying height stabilized even if this design was made in view of said situation and the magnetic head moved to which part by the side of the inner circumference of a magnetic disk and a periphery is securable, even if it is the case where it is installed in the big location of the difference in elevation, surfacing transit stability can fully be stabilized, and it aims at offering the magnetic-head slider which can secure the suitable flying height.
[0011]
[Means for Solving the Problem]
In order to solve said technical problem the magnetic-head slider of this design The medium opposed face by the side of the magnetic disk of the body of a slider is equipped with two or more positive pressure generating sections for a magnetic-head core coming [the inside of the tabular body of a slider]. The 1st negative pressure generating section is formed in the posterior part side of the 1st connection section. 1st 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider among these positive pressure generating sections connects by the 1st connection section — having — this — And a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider is characterized by having the include angle.
Said two or more positive pressure generating sections can consist of preferably the 2nd 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of [1 to prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider] the posterior part of the 1st positive pressure generating section and body of a slider.
And the 1st positive pressure generating section and the 2nd positive pressure generating section which adjoin each other along with the edges-on-both-sides section of the body of a slider may be connected by the 2nd connection section, respectively.
Moreover, as for the include angle which a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider makes, it is desirable that it is 5 - 60 degrees.
[0012]
[The gestalt of implementation of a design]
Hereafter, the example of this design is explained with reference to a drawing.
Drawing 1 and drawing 2 show the example of the magnetic-head slider concerning this design, and the magnetic-head slider of this example is equipped with the magnetic core 30 of a configuration of mentioning later on the tabular body 10 of a slider. On the whole, parts other than the magnetic-core 30 part of the body 10 of a slider are used like the conventional magnetic head which comes to consist of substrates, such as a product made from the ceramics, and is shown in drawing 7 .
Two side rails 11 and 11 from the anterior part side of the body 10 of a slider to [are located in the edges-on-both-sides section, and] a posterior part side are made the base (medium opposed face which is a top face in drawing 1 and drawing 2 , and counters a magnetic disk) of said body 10 of a slider.
In addition, it is the side into which it is the side into which the body 10 bottom of a slider in drawing 1 is called the anterior part side of the body 10 of a slider, this anterior part side is generally called the leading side of a slider on these specifications, and the airstream from a magnetic disk flows, and the body 10 bottom of a slider in drawing 1 is called the posterior part side of the body 10 of a slider on the contrary, this posterior part side is generally called the trailing side of a slider, and the airstream from a magnetic disk flows.
[0013]
In this example, two side rails 11 and 11 are formed in the same flat-surface configuration, and are connected by the 1st connection section 12. The configurations of these side rails 11 and 11

may differ.
Inclined plane 11a by which each side rails 11 and 11 were formed in the anterior part side of the body 10 of a slider, A posterior part side is followed from this inclined plane 11a. 1st positive pressure generating section 11b of the body 10 of a slider mostly extended to a center section, It consists of the 2nd connection section 11c which connects 11d of 2nd positive pressure generating section of the body 10 of a slider mostly applied and located in a posterior part side from a center section, and 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section.
Side rails 11 and 11 are formed inside the both-sides edge of the body 10 of a slider, and the step 31 is formed in the side outside of a side rail 11. Moreover, the back end of side rails 11 and 11 is formed inside the posterior part edge of the body 10 of a slider, and the step 32 is formed in the back outside of a side rail 11.
[0014]
Inclined plane 11a is formed in the shape of a rectangle. Production Wakebe 13a of the 2 sides 13 and 14 where the flat-surface configuration of 1st positive pressure generating section 11b is parallel to the side face of the body 10 of a slider of inclined plane 11a which comes to extend 13 to a posterior part side one side, Slanting segment section 13b prolonged in the direction of posterior part side slant following this, and parallel segment section 13c prolonged in parallel with the side face of the body 10 of a slider to a posterior part side following this, It is the configuration surrounded in production Wakebe 14a which comes to extend the side 14 of another side of said inclined plane 11a to a posterior part side, slanting segment section 14b prolonged in parallel with said slanting segment section 13b to a posterior part side following this, and the back end segment section 15 parallel to the end face of the body 10 of a slider.
[0015]
11d of 2nd positive pressure generating section is formed in the posterior part side of 1st positive pressure generating section 11b through the equal-width slot 17. Moreover, the flat-surface configuration The slanting segment section 18 parallel to slanting segment section 14of 1st positive pressure generating section 11b b, The bay 19 located on extension of parallel segment section 13c of 1st positive pressure generating section 11b, It is the configuration in which the anterior part side point of the trapezoid which consists of a bay 20 located on extension of production Wakebe 14a of 1st positive pressure generating section 11b and the back end segment section 21 parallel to the end face of the body 10 of a slider was cut aslant, was lacked to the bay 20, and the notch 22 was formed.
[0016]
And the 1st positive pressure generating section 11b and 11b of the pair currently formed in the edges-on-both-sides section of the body 10 of a slider is connected by the 1st connection section 12 on production Wakebe 13a of these insides, and 14a, and the 1st negative pressure generating section 16 is formed in the posterior part side of this 1st connection section 12. Thus, by considering as the configuration which closed the anterior part side (airstream close side) of the 1st negative pressure generating section 16 in the 1st connection section 12, the negative pressure generated in this 1st negative pressure generating section 16 can be enlarged.

[0017]
Moreover, in this example, an anterior part side [11d of 2nd positive pressure generating section] point and 1st positive pressure generating section 11b are connected by 2nd rectangle-like connection section 11c. Thus, the negative pressure generated in the 1st negative pressure generating section 16 can be further enlarged by considering as the configuration which closed the slot 17 between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section by 2nd connection section 11c.
Moreover, between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section which adjoins each other along with the edges-on-both-sides section of the body 10 of a slider, the 2nd negative pressure generating section 23 and the 3rd negative pressure generating section 24 are formed, respectively. And the negative pressure generated in the negative pressure generating section 23 by the side of airstream appearance,

i.e., the 2nd negative pressure generating section, rather than this 2nd connection section 11c can be enlarged by considering as the configuration which closed the slot 17 between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section by 2nd connection section 11c.
Moreover, it is also possible to consider as the configuration which does not prepare 2nd connection section 11c, and in this case, although the surfacing stability by the difference in elevation deteriorates a little, the degree of freedom of a design increases.
[0018]
Let the direction which connects the top-most vertices A where parallel segment section 13c of 1st positive pressure generating section 11b and the back end segment section 15 in the top view of a magnetic-head slider cross here in this specification, these top-most vertices A, and the top-most vertices B of the front end section of inclined plane 11a located on the diagonal line be the longitudinal direction of 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section.
It arranges and the magnetic-head slider of this example is used so that said top-most vertices A may be located in the periphery side of a magnetic disk from top-most vertices B. And if the include angle theta which a positive pressure generating sections [1st and 2nd /b / 11 / and 11d] longitudinal direction and a direction parallel to the side face of the body 10 of a slider make is changed, the surfacing height when being located in a surfacing height [in case surfacing height to angle-of-skew gamma becomes easy to change and the magnetic head is located in inner circumference side of magnetic disk by this], and periphery side can be adjusted exactly. For example, the surfacing height by the side of a periphery is made low, so that an include angle theta is enlarged, as shown in drawing 3 , and the surfacing height by the side of inner circumference is made high, namely, it can be made to change from the condition shown by the drawing 3 destructive line to the condition which shows as a continuous line.
5 to 60 degrees, this include angle theta has the desirable range of 5 - 30 degrees, and since the surfacing height by the side of a periphery will become low too much if preferably larger than this, since the surfacing height by the side of a periphery will become high too much if smaller than this, it is not more preferably desirable. An include angle theta is suitably set up according to a setup of angle-of-skew gamma or specification in a magnetic disk drive.
[0019]
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk can be changed by changing die-length C in a direction parallel to the side face of the body 10 of a slider from the front end of inclined plane 11a to the back end of 1st positive pressure generating section 11b. For example, it can be made to change to the condition which shows as a continuous line from the condition which the surfacing height in a center section is made low, namely, shows it by the drawing 4 destructive line, so that die-length C is shortened, as shown in drawing 4 .
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk can be changed also by changing die-length D in a direction parallel to the side face of the body 10 of a slider from the front end of inclined plane 11a to 2nd connection section 11c. For example, it can be made to change to the condition which shows as a continuous line from the condition which the surfacing height in a center section is made low, namely, shows it by the drawing 4 destructive line, so that die-length D is shortened, as shown in drawing 4 .
Pitch angle alpha of the magnetic head can be adjusted by furthermore changing ten bodies lay length of slider E of the 1st connection section 12. For example, pitch angle alpha becomes small, so that die-length E of this connection section 12 is enlarged.
[0020]
Next, the structure of the magnetic core 30 formed in the periphery side by the side of the back end section of the body 10 of a slider is explained.
The magnetic core 30 shown in this example is a compound-die magnetic-head core as shows cross-section structure to drawing 5 and drawing 6 , and the laminating of MR head (read head) h1 and the inductive head (write head) h2 is carried out to order, and it is constituted by the

back end side (trailing side edge side) of the body 10 of a slider.
[0021]
MR head h1 detects the leakage flux from record media, such as a disk, using a magneto-resistive effect, and reads a magnetic signal.
As shown in drawing 5 and drawing 6 , the lower gap layer 54 formed of non-magnetic materials, such as an alumina (aluminum 2O3), on the lower shielding layer 53 which MR head h1 becomes from magnetic alloys, such as Sendust (Fe-aluminum-Si) formed in the back end section of the body 10 of a slider, is formed, and the laminating of the magneto-resistive effect ingredient film 55 is carried out on this lower gap layer 54.
The electrode layer which gives the hard bias layer which gives a bias field to this film, and a detection current to the both sides of said giant magneto-resistance ingredient film 55 is formed, an up gap layer is further formed on it, and the up shielding layer is formed on it, and let this up shielding layer at combination be the lower core layer 45 of the inductive head h2 formed on it.
[0022]
The coil layer 46 patternized so that the gap layer 44 might be formed on the lower core layer 45 and an inductive head h2 might become spiral superficially on it is formed, and the coil layer 46 is surrounded by the insulating material layer 47. In the point 48a, the up core layer 48 formed on the insulating material layer 47 opens a minute gap in the lower core layer 45, counters it in ABS side 51b, connects the end face section 48b to the lower core layer 45 magnetically, and is prepared. Moreover, on the up core layer 48, the protective layer 49 which consists of an alumina etc. is formed.
[0023]
In an inductive head h2, a record current is given to the coil layer 46 and a record field is given to a core layer from the coil layer 46. And a magnetic signal is recordable on magnetic-recording media, such as a magnetic disk, with the leakage field from the point of the lower core layer 45 in the part of magnetic gap G, and the up core layer 48.
Moreover, in MR head h1, since the electric resistance of the magneto-resistive effect ingredient film 55 changes with the existence of the minute leakage field from a magnetic disk, the contents of record of a magnetic disk can be read by reading this resistance change.
[0024]
If it is in the magnetic-head slider 10 constituted like the above, surfacing transit is carried out to CSS being to a magnetic disk 1 like the magnetic head 2 of the conventional example shown in drawing 7 , and writing and reading of magnetic information are performed if needed.
Therefore, in the condition that the magnetic disk 1 has stopped, the magnetic-head slider has stopped the base of the side rail 11 in the state of push **** lightly by the energization force of a leaf 3 on the front face of a magnetic disk 1.
[0025]
If a magnetic disk 1 begins rotation from this condition, an air current will arise on a magnetic-disk front face, and this air current will come to flow into the base side of the body 10 of a slider through the inclined planes 11a and 11a of the body 10 of a slider. Here, as for the body 10 of a slider, surfacing will be begun if this lift becomes the magnitude which overcomes the energization force of a leaf 3, since lift occurs in inclined planes 11a and 11a according to this air-current generating. Moreover, air and inclined plane 11a which passed through inclined planes 11a and 11a, and flowed into the base side of the body 10 of a slider, The air which passed the 1st connection section 12 between 11a flows into the 1st negative pressure generating section 16, big negative pressure is generated here, and the body 10 of a slider inclines like the magnetic head 2 shown in drawing 8 by pitch angle alpha predetermined in the condition of having raised the inclined plane 11a side upwards.
[0026]
Moreover, although a part of air which passed through inclined planes 11a and 11a flows along with a side rail 11 and positive pressure is generated in 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section, the air which passed through inclined planes 11a and 11a, and flowed into the 2nd negative pressure generating section 23 generates negative pressure also in the 2nd negative pressure generating section 23. Moreover, the air

which passed through inclined planes 11a and 11a, and flowed into the 3rd negative pressure generating section 24 generates negative pressure also in the 3rd negative pressure generating section 24.
If negative pressure occurs here in three places, the 1st negative pressure generating section 16, the 2nd negative pressure generating section 23 located in the both sides, and the 3rd negative pressure generating section 24, since the force of attracting the body 10 of a slider to a magnetic-disk 1 side by the location which makes negative pressure acting on the body 10 of a slider becoming three places will occur in three places, the body 10 of a slider can be attracted to a magnetic-disk 1 side with the good suction force of balance. Moreover, since strong negative pressure occurs in this 1st negative pressure generating section 16 by having closed the airstream close side of the 1st negative pressure generating section 16 in the 1st connection section 12 especially, thereby, the central part of the body 10 of a slider can be attracted to magnetic-disk side 1 with a strong suction force. Therefore, the surfacing stability of the body 10 of a slider can be raised.
[0027]
Next, although steps 31 and 32 are formed in the both-sides edge section and the trailing edge of the body 10 of a slider, these steps 31 and 32 prevent that the edge section of the side near the magnetic disk 1 of the body 10 of a slider contacts a magnetic disk 1, when roll angle beta of the body 10 of a slider becomes large according to a certain cause. Moreover, although the probability for the back end section of the body 10 of a slider to contact a magnetic disk 1 with a roll ring is low since the flying height is fully securable when the body 1 of a slider completes surfacing transit Although a possibility of contacting back end both the edges of the body 10 of a slider to a magnetic disk 1 will be produced if big rolling is produced in this case since the flying height is small when the body 10 of a slider starts surfacing in CSS This problem can be reduced by forming a step 31. Moreover, it can prevent cutting a side rail 11 according to the error at the time of magnetic-head slider cutting by forming steps 31 and 32.
[0028]
Moreover, according to the magnetic-head slider of this example, the surfacing height when being located in a surfacing height [in case the magnetic head is located in inner circumference side of magnetic disk], and periphery side is controllable by adjusting the include angle theta which a positive pressure generating sections [1st and 2nd /b / 11 / and 11d] longitudinal direction and a direction parallel to the side face of the body 10 of a slider make.
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk is controllable by adjusting die-length D from die-length C from the front end of inclined plane 11a to the back end of 1st positive pressure generating section 11b, or the front end of inclined plane 11a to 2nd connection section 11c. Thus, since the profile of a surfacing property is controllable by the structure parameter of a head slider, the flying height of a slider can be stabilized corresponding to the transit conditions of arbitration.
Moreover, since the airstream close side of the 1st negative pressure generating section 16 is closed in the 1st connection section 12, strong negative pressure occurs in this 1st negative pressure generating section 16, and a strong suction force is acquired. In case the effect on the flying height by the difference in elevation of an installation can be reduced, therefore the magnetic head is installed in the location where the altitude is high by this, it can stop that the flying height of a head slider falls.
By furthermore adjusting ten bodies lay length of slider E of the 1st connection section 12, pitch angle alpha of the magnetic head is controllable.
[0029]
[Effect of the Device]
As explained above, the magnetic-head slider of this design The medium opposed face by the side of the magnetic disk of the body of a slider is equipped with two or more positive pressure generating sections for a magnetic-head core coming [the inside of the tabular body of a slider]. The 1st negative pressure generating section is formed in the posterior part side of the 1st connection section. 1st 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider among these positive

pressure generating sections connects by the 1st connection section -- having -- this -- And a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider is characterized by having the include angle.
Therefore, big negative pressure is obtained in the 1st negative pressure generating section, and even if it is the case where this installs the magnetic head in the big location of the difference in elevation, the run state which could secure the suitable flying height and was stabilized can be acquired.
Moreover, since the surfacing property profile of a head slider is controllable by adjusting the include angle which a direction parallel to the 1st positive pressure generating section and the side face of the body of a slider makes The peripheral speed of a magnetic disk differs by the inner circumference [of a magnetic disk], or periphery side. The magnetic-head slider which can suppress change of the flying height resulting from that the air contents which flow into the pars-basilaris-ossis-occipitalis side of the body of a slider differ somewhat, or an angle of skew changing, can stabilize the flying height of the body of a slider, and can stabilize a surfacing run state can be offered.
[0030]
In said configuration, the configuration which two or more positive pressure generating sections become from 2nd 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of [1 to prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider] the posterior part of the 1st positive pressure generating section and body of a slider, then control of the flying height become easy.
Moreover, the configuration with which the 1st positive pressure generating section and the 2nd positive pressure generating section which adjoin each other along with the edges-on-both-sides section of the body of a slider are connected by the 2nd connection section, respectively, then negative pressure become large, and the effect of the difference in elevation can be reduced. The flying height can be made regularity for the include angle which a direction still more nearly parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider makes over a periphery from 5 - 60 degrees, then inner circumference.

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TECHNICAL FIELD

[The technical field to which a design belongs]
This design is related with the magnetic-head slider which enabled it to stabilize especially a surfacing property about the magnetic-head slider which surfaces a magnetic-recording medium top at minute spacing, and performs record playback of magnetic information.
[0002]

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PRIOR ART

[Description of the Prior Art]
Conventionally, in the magnetic recording medium for computers, the magnetic disk drive as shown in drawing 7 is known.
This magnetic disk drive is the configuration that opposite arrangement of the magnetic head 2 was carried out on the disc-like magnetic disk 1 formed free [rotation], and the magnetic head 2 is supported by the support arm 4 through the 3 square-shape-like leaf 3, and it is constituted so that the magnetic head 2 can move to the location of a request of the diameter direction of a magnetic disk 1 by rotation actuation centering on rotation core 4a of the support arm 4.
[0003]
When the magnetic disk 1 has stopped in the magnetic disk drive of a configuration of being shown in drawing 7 , When the base of the magnetic head 2 is lightly forced on the magnetic disk 1 by the energization force of the leaf 3 which supports the magnetic head 2 and the magnetic disk 1 is rotating If the magnetic head 2 is constituted so that surfacing transit of the magnetic-disk 1 top may be carried out in predetermined height, and rotation of a magnetic disk 1 is suspended using the flow of the air produced with rotation, again, the magnetic head 2 which was carrying out surfacing transit will contact a magnetic disk 1, and will be stopped. And it is constituted so that R/W of magnetic information may be made to the magnetic-recording layer of a magnetic disk 1 at the time of the aforementioned surfacing transit, and this actuation situation of a series of is usually called CSS (contact start stop).
[0004]
Drawing 8 and drawing 9 are what shows the surfacing run state of the magnetic head 2 of 2 rail molds used widely now. In the base of this magnetic head 2 One slot 5 is formed in a center section, and side rails 6 and 6 are formed in the both sides. To the tip inferior-surface-of-tongue side (improvement style side in the method of rotation of a magnetic disk 1) of each side rail 6 Inclined plane 6a is formed, the base of the side rail 6 of the magnetic head 2 serves as the positive pressure generating section because air flows as shown in the arrow head A of drawing 8 through this inclined plane 6a, and the magnetic head 2 carries out surfacing transit.
Moreover, as the two-dot chain line of drawing 8 shows, negative pressure slot 6b is formed in the base of a side rail 2, and the configuration of the magnetic head aiming at stabilization of surfacing performance traverse is also known by balancing the negative pressure generated in this negative pressure slot 6b, the positive pressure generated in said side rails 6 and 6, and a spring pressure.
[0005]
By the way, although the condition as which drawing 8 regarded the magnetic head 2 from the side-face side, and the condition that drawing 9 looked at the magnetic head 2 from the posterior part side are shown Since air flows into the base side of the magnetic head 2 through inclined plane 6a when the magnetic head 2 is carrying out surfacing transit, The magnetic head 2 is carrying out surfacing transit, carrying out the minute include-angle inclination of the airstream close side in the condition of having raised upwards, as shown in drawing 8 , and, generally whenever [this tilt-angle] is called the pitch angle (alpha : usually 100-500microRad extent). Moreover, as shown in drawing 9 , when the magnetic head 2 of a surfacing run state is

seen from a posterior part, the include angle toward which the magnetic head 2 inclines right and left is called the roll angle (beta).
Although the center line (it passes along the core of the magnetic head 2, and is a line parallel to the side face of the magnetic head 2) a of the magnetic head 2 and the tangent b of the magnetic disk 2 which passes the center line part of the magnetic head 2 will not be in agreement on the other hand when the magnetic head 2 moves to a location as shown by sign 2' of drawing 7 by rotation of the support arm 4, the include-angle gap in this case is called the angle of skew (gamma).
And the pitch angle and the roll angle are used as one standard of transit stability.
[0006]
If it is in the magnetic head 2 of the above configurations Since it is more advantageous for the magnetic head 2 to approach the magnetic-recording layer of a magnetic disk 1 if it sees from the field of magnetic recording Since it is necessary to make it the magnetic head 2 not collide with detailed foreign matters, such as dust on a magnetic disk 1, if it is desirable to make the height at the time of surfacing transit as low as possible and it sees from stabilization of surfacing performance traverse, and the field of dependability There is a conflicting requirement as it is desirable to make the height at the time of surfacing transit as high as possible, in the present condition, the blending point of this conflicting requirement is taken and surfacing height is set up.
[0007]
However, in a magnetic disk 1, since peripheral speed differs and the air contents which flow into the pars-basilaris-ossis-occipitalis side of the magnetic head 2 also differ, the surfacing height of the magnetic head 2 will differ by the inner circumference [of a magnetic disk 1], and periphery side at a periphery and periphery section side. And there is a problem to which the positive pressure generated in two side rails 6 of the magnetic head 2 comes to differ, these influence complexly, and gap flying height and pitch angle alpha and roll angle beta of the magnetic head 2 become unstable by rotation of the support arm 4 since angle-of-skew gamma of the magnetic head 2 differs by the inner circumference [of a magnetic disk 2] and periphery side.
[0008]
Even if it is the case where angle-of-skew gamma of the magnetic head 2 changes from the above backgrounds Namely, although a pitch angle and a roll angle have little effect and to develop the magnetic head which can secure the stable flying height is desired even if the magnetic head moves to which part by the side of the inner circumference of a magnetic disk, and a periphery If it was in the magnetic head 2 of the structure of having two, about the conventional side rail 6, there was a fault from which the flying height, a roll angle, and a pitch angle change sensitively to change of an angle of skew.
[0009]
Then, conventionally, U character-like the rail section, a slot, etc. are formed in the base central site of the magnetic head other than the positive pressure generating section which is mainly concerned with a side rail, the negative pressure generating section is formed, and the magnetic head of the structure which was going to balance positive pressure and negative pressure skillfully and was going to stabilize the surfacing run state is known.
This kind of magnetic head can be seen to JP,6-44719,A, JP,6-124562,A, JP,6-195916,A, JP,6-215516,A, etc.
However, even if it was in the magnetic head concerning these patents, when the atmospheric pressure of the location in which the magnetic head is prepared was low (i.e., when used in the state of low voltage by the effect of the difference in elevation of an installation), there was a possibility of producing lack at transit stability, for example.
[0010]

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Device]
As explained above, the magnetic-head slider of this design The medium opposed face by the side of the magnetic disk of the body of a slider is equipped with two or more positive pressure generating sections for a magnetic-head core coming [the inside of the tabular body of a slider]. The 1st negative pressure generating section is formed in the posterior part side of the 1st connection section. 1st 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider among these positive pressure generating sections connects by the 1st connection section -- having -- this -- And a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider is characterized by having the include angle.
Therefore, big negative pressure is obtained in the 1st negative pressure generating section, and even if it is the case where this installs the magnetic head in the big location of the difference in elevation, the run state which could secure the suitable flying height and was stabilized can be acquired.
Moreover, since the surfacing property profile of a head slider is controllable by adjusting the include angle which a direction parallel to the 1st positive pressure generating section and the side face of the body of a slider makes The peripheral speed of a magnetic disk differs by the inner circumference [of a magnetic disk], or periphery side. The magnetic-head slider which can suppress change of the flying height resulting from that the air contents which flow into the pars-basilaris-ossis-occipitalis side of the body of a slider differ somewhat, or an angle of skew changing, can stabilize the flying height of the body of a slider, and can stabilize a surfacing run state can be offered.
[0030]
In said configuration, the configuration which two or more positive pressure generating sections become from 2nd 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of [1 to prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider] the posterior part of the 1st positive pressure generating section and body of a slider, then control of the flying height become easy.
Moreover, the configuration with which the 1st positive pressure generating section and the 2nd positive pressure generating section which adjoin each other along with the edges-on-both-sides section of the body of a slider are connected by the 2nd connection section, respectively, then negative pressure become large, and the effect of the difference in elevation can be reduced. The flying height can be made regularity for the include angle which a direction still more nearly parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider makes over a periphery from 5 - 60 degrees, then inner circumference.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Device]
While the flying height stabilized even if this design was made in view of said situation and the magnetic head moved to which part by the side of the inner circumference of a magnetic disk and a periphery is securable, even if it is the case where it is installed in the big location of the difference in elevation, surfacing transit stability can fully be stabilized, and it aims at offering the magnetic-head slider which can secure the suitable flying height.
[0011]

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MEANS

[Means for Solving the Problem]
In order to solve said technical problem the magnetic-head slider of this design The medium opposed face by the side of the magnetic disk of the body of a slider is equipped with two or more positive pressure generating sections for a magnetic-head core coming [the inside of the tabular body of a slider]. The 1st negative pressure generating section is formed in the posterior part side of the 1st connection section. 1st 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider among these positive pressure generating sections connects by the 1st connection section — having — this — And a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider is characterized by having the include angle.
Said two or more positive pressure generating sections can consist of preferably the 2nd 1 to positive pressure generating section prepared in the edges-on-both-sides section by the side of [1 to prepared in the edges-on-both-sides section by the side of the anterior part of the body of a slider] the posterior part of the 1st positive pressure generating section and body of a slider.
And the 1st positive pressure generating section and the 2nd positive pressure generating section which adjoin each other along with the edges-on-both-sides section of the body of a slider may be connected by the 2nd connection section, respectively.
Moreover, as for the include angle which a direction parallel to the longitudinal direction of said 1st positive pressure generating section and the side face of the body of a slider makes, it is desirable that it is 5 - 60 degrees.
[0012]
[The gestalt of implementation of a design]
Hereafter, the example of this design is explained with reference to a drawing.
Drawing 1 and drawing 2 show the example of the magnetic-head slider concerning this design, and the magnetic-head slider of this example is equipped with the magnetic core 30 of a configuration of mentioning later on the tabular body 10 of a slider. On the whole, parts other than the magnetic-core 30 part of the body 10 of a slider are used like the conventional magnetic head which comes to consist of substrates, such as a product made from the ceramics, and is shown in drawing 7 .
Two side rails 11 and 11 from the anterior part side of the body 10 of a slider to [are located in the edges-on-both-sides section, and] a posterior part side are made the base (medium opposed face which is a top face in drawing 1 and drawing 2 , and counters a magnetic disk) of said body 10 of a slider.
In addition, it is the side into which it is the side into which the body 10 bottom of a slider in drawing 1 is called the anterior part side of the body 10 of a slider, this anterior part side is generally called the leading side of a slider on these specifications, and the airstream from a magnetic disk flows, and the body 10 bottom of a slider in drawing 1 is called the posterior part side of the body 10 of a slider on the contrary, this posterior part side is generally called the trailing side of a slider, and the airstream from a magnetic disk flows.

[0013]
In this example, two side rails 11 and 11 are formed in the same flat-surface configuration, and are connected by the 1st connection section 12. The configurations of these side rails 11 and 11 may differ.
Inclined plane 11a by which each side rails 11 and 11 were formed in the anterior part side of the body 10 of a slider, A posterior part side is followed from this inclined plane 11a. 1st positive pressure generating section 11b of the body 10 of a slider mostly extended to a center section, It consists of the 2nd connection section 11c which connects 11d of 2nd positive pressure generating section of the body 10 of a slider mostly applied and located in a posterior part side from a center section, and 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section.
Side rails 11 and 11 are formed inside the both-sides edge of the body 10 of a slider, and the step 31 is formed in the side outside of a side rail 11. Moreover, the back end of side rails 11 and 11 is formed inside the posterior part edge of the body 10 of a slider, and the step 32 is formed in the back outside of a side rail 11.
[0014]
Inclined plane 11a is formed in the shape of a rectangle. Production Wakebe 13a of the 2 sides 13 and 14 where the flat-surface configuration of 1st positive pressure generating section 11b is parallel to the side face of the body 10 of a slider of inclined plane 11a which comes to extend 13 to a posterior part side one side, Slanting segment section 13b prolonged in the direction of posterior part side slant following this, and parallel segment section 13c prolonged in parallel with the side face of the body 10 of a slider to a posterior part side following this, It is the configuration surrounded in production Wakebe 14a which comes to extend the side 14 of another side of said inclined plane 11a to a posterior part side, slanting segment section 14b prolonged in parallel with said slanting segment section 13b to a posterior part side following this, and the back end segment section 15 parallel to the end face of the body 10 of a slider.
[0015]
11d of 2nd positive pressure generating section is formed in the posterior part side of 1st positive pressure generating section 11b through the equal-width slot 17. Moreover, the flat-surface configuration The slanting segment section 18 parallel to slanting segment section 14of 1st positive pressure generating section 11b b, The bay 19 located on extension of parallel segment section 13c of 1st positive pressure generating section 11b, It is the configuration in which the anterior part side point of the trapezoid which consists of a bay 20 located on extension of production Wakebe 14a of 1st positive pressure generating section 11b and the back end segment section 21 parallel to the end face of the body 10 of a slider was cut aslant, was lacked to the bay 20, and the notch 22 was formed.
[0016]
And the 1st positive pressure generating section 11b and 11b of the pair currently formed in the edges-on-both-sides section of the body 10 of a slider is connected by the 1st connection section 12 on production Wakebe 13a of these insides, and 14a, and the 1st negative pressure generating section 16 is formed in the posterior part side of this 1st connection section 12. Thus, by considering as the configuration which closed the anterior part side (airstream close side) of the 1st negative pressure generating section 16 in the 1st connection section 12, the negative pressure generated in this 1st negative pressure generating section 16 can be enlarged.

[0017]
Moreover, in this example, an anterior part side [11d of 2nd positive pressure generating section] point and 1st positive pressure generating section 11b are connected by 2nd rectangle-like connection section 11c. Thus, the negative pressure generated in the 1st negative pressure generating section 16 can be further enlarged by considering as the configuration which closed the slot 17 between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section by 2nd connection section 11c.
Moreover, between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section which adjoins each other along with the edges-on-both-sides

section of the body 10 of a slider, the 2nd negative pressure generating section 23 and the 3rd negative pressure generating section 24 are formed, respectively. And the negative pressure generated in the negative pressure generating section 23 by the side of airstream appearance, i.e., the 2nd negative pressure generating section, rather than this 2nd connection section 11c can be enlarged by considering as the configuration which closed the slot 17 between 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section by 2nd connection section 11c.
Moreover, it is also possible to consider as the configuration which does not prepare 2nd connection section 11c, and in this case, although the surfacing stability by the difference in elevation deteriorates a little, the degree of freedom of a design increases.
[0018]
Let the direction which connects the top-most vertices A where parallel segment section 13c of 1st positive pressure generating section 11b and the back end segment section 15 in the top view of a magnetic-head slider cross here in this specification, these top-most vertices A, and the top-most vertices B of the front end section of inclined plane 11a located on the diagonal line be the longitudinal direction of 1st positive pressure generating section 11b and 11d of 2nd positive pressure generating section.
It arranges and the magnetic-head slider of this example is used so that said top-most vertices A may be located in the periphery side of a magnetic disk from top-most vertices B. And if the include angle theta which a positive pressure generating sections [1st and 2nd /b / 11 / and 11d] longitudinal direction and a direction parallel to the side face of the body 10 of a slider make is changed, the surfacing height when being located in a surfacing height [in case surfacing height to angle-of-skew gamma becomes easy to change and the magnetic head is located in inner circumference side of magnetic disk by this], and periphery side can be adjusted exactly. For example, the surfacing height by the side of a periphery is made low, so that an include angle theta is enlarged, as shown in drawing 3 , and the surfacing height by the side of inner circumference is made high, namely, it can be made to change from the condition shown by the drawing 3 destructive line to the condition which shows as a continuous line.
5 to 60 degrees, this include angle theta has the desirable range of 5 - 30 degrees, and since the surfacing height by the side of a periphery will become low too much if preferably larger than this, since the surfacing height by the side of a periphery will become high too much if smaller than this, it is not more preferably desirable. An include angle theta is suitably set up according to a setup of angle-of-skew gamma or specification in a magnetic disk drive.
[0019]
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk can be changed by changing die-length C in a direction parallel to the side face of the body 10 of a slider from the front end of inclined plane 11a to the back end of 1st positive pressure generating section 11b. For example, it can be made to change to the condition which shows as a continuous line from the condition which the surfacing height in a center section is made low, namely, shows it by the drawing 4 destructive line, so that die-length C is shortened, as shown in drawing 4 .
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk can be changed also by changing die-length D in a direction parallel to the side face of the body 10 of a slider from the front end of inclined plane 11a to 2nd connection section 11c. For example, it can be made to change to the condition which shows as a continuous line from the condition which the surfacing height in a center section is made low, namely, shows it by the drawing 4 destructive line, so that die-length D is shortened, as shown in drawing 4 .
Pitch angle alpha of the magnetic head can be adjusted by furthermore changing ten bodies lay length of slider E of the 1st connection section 12. For example, pitch angle alpha becomes small, so that die-length E of this connection section 12 is enlarged.
[0020]
Next, the structure of the magnetic core 30 formed in the periphery side by the side of the back end section of the body 10 of a slider is explained.

The magnetic core 30 shown in this example is a compound-die magnetic-head core as shows cross-section structure to drawing 5 and drawing 6 , and the laminating of MR head (read head) h1 and the inductive head (write head) h2 is carried out to order, and it is constituted by the back end side (trailing side edge side) of the body 10 of a slider.
[0021]
MR head h1 detects the leakage flux from record media, such as a disk, using a magneto-resistive effect, and reads a magnetic signal.
As shown in drawing 5 and drawing 6 , the lower gap layer 54 formed of non-magnetic materials, such as an alumina (aluminum 2O3), on the lower shielding layer 53 which MR head h1 becomes from magnetic alloys, such as Sendust (Fe-aluminum-Si) formed in the back end section of the body 10 of a slider, is formed, and the laminating of the magneto-resistive effect ingredient film 55 is carried out on this lower gap layer 54.
The electrode layer which gives the hard bias layer which gives a bias field to this film, and a detection current to the both sides of said giant magneto-resistance ingredient film 55 is formed, an up gap layer is further formed on it, and the up shielding layer is formed on it, and let this up shielding layer at combination be the lower core layer 45 of the inductive head h2 formed on it.
[0022]
The coil layer 46 patternized so that the gap layer 44 might be formed on the lower core layer 45 and an inductive head h2 might become spiral superficially on it is formed, and the coil layer 46 is surrounded by the insulating material layer 47. In the point 48a, the up core layer 48 formed on the insulating material layer 47 opens a minute gap in the lower core layer 45, counters it in ABS side 51b, connects the end face section 48b to the lower core layer 45 magnetically, and is prepared. Moreover, on the up core layer 48, the protective layer 49 which consists of an alumina etc. is formed.
[0023]
In an inductive head h2, a record current is given to the coil layer 46 and a record field is given to a core layer from the coil layer 46. And a magnetic signal is recordable on magnetic-recording media, such as a magnetic disk, with the leakage field from the point of the lower core layer 45 in the part of magnetic gap G, and the up core layer 48.
Moreover, in MR head h1, since the electric resistance of the magneto-resistive effect ingredient film 55 changes with the existence of the minute leakage field from a magnetic disk, the contents of record of a magnetic disk can be read by reading this resistance change.
[0024]
If it is in the magnetic-head slider 10 constituted like the above, surfacing transit is carried out to CSS being to a magnetic disk 1 like the magnetic head 2 of the conventional example shown in drawing 7 , and writing and reading of magnetic information are performed if needed.
Therefore, in the condition that the magnetic disk 1 has stopped, the magnetic-head slider has stopped the base of the side rail 11 in the state of push **** lightly by the energization force of a leaf 3 on the front face of a magnetic disk 1.
[0025]
If a magnetic disk 1 begins rotation from this condition, an air current will arise on a magnetic-disk front face, and this air current will come to flow into the base side of the body 10 of a slider through the inclined planes 11a and 11a of the body 10 of a slider. Here, as for the body 10 of a slider, surfacing will be begun if this lift becomes the magnitude which overcomes the energization force of a leaf 3, since lift occurs in inclined planes 11a and 11a according to this air-current generating. Moreover, air and inclined plane 11a which passed through inclined planes 11a and 11a, and flowed into the base side of the body 10 of a slider, The air which passed the 1st connection section 12 between 11a flows into the 1st negative pressure generating section 16, big negative pressure is generated here, and the body 10 of a slider inclines like the magnetic head 2 shown in drawing 8 by pitch angle alpha predetermined in the condition of having raised the inclined plane 11a side upwards.
[0026]
Moreover, although a part of air which passed through inclined planes 11a and 11a flows along with a side rail 11 and positive pressure is generated in 1st positive pressure generating section

11b and 11d of 2nd positive pressure generating section, the air which passed through inclined planes 11a and 11a, and flowed into the 2nd negative pressure generating section 23 generates negative pressure also in the 2nd negative pressure generating section 23. Moreover, the air which passed through inclined planes 11a and 11a, and flowed into the 3rd negative pressure generating section 24 generates negative pressure also in the 3rd negative pressure generating section 24.
If negative pressure occurs here in three places, the 1st negative pressure generating section 16, the 2nd negative pressure generating section 23 located in the both sides, and the 3rd negative pressure generating section 24, since the force of attracting the body 10 of a slider to a magnetic-disk 1 side by the location which makes negative pressure acting on the body 10 of a slider becoming three places will occur in three places, the body 10 of a slider can be attracted to a magnetic-disk 1 side with the good suction force of balance. Moreover, since strong negative pressure occurs in this 1st negative pressure generating section 16 by having closed the airstream close side of the 1st negative pressure generating section 16 in the 1st connection section 12 especially, thereby, the central part of the body 10 of a slider can be attracted to magnetic-disk side 1 with a strong suction force. Therefore, the surfacing stability of the body 10 of a slider can be raised.
[0027]
Next, although steps 31 and 32 are formed in the both-sides edge section and the trailing edge of the body 10 of a slider, these steps 31 and 32 prevent that the edge section of the side near the magnetic disk 1 of the body 10 of a slider contacts a magnetic disk 1, when roll angle beta of the body 10 of a slider becomes large according to a certain cause. Moreover, although the probability for the back end section of the body 10 of a slider to contact a magnetic disk 1 with a roll ring is low since the flying height is fully securable when the body 1 of a slider completes surfacing transit Although a possibility of contacting back end both the edges of the body 10 of a slider to a magnetic disk 1 will be produced if big rolling is produced in this case since the flying height is small when the body 10 of a slider starts surfacing in CSS This problem can be reduced by forming a step 31. Moreover, it can prevent cutting a side rail 11 according to the error at the time of magnetic-head slider cutting by forming steps 31 and 32.
[0028]
Moreover, according to the magnetic-head slider of this example, the surfacing height when being located in a surfacing height [in case the magnetic head is located in inner circumference side of magnetic disk], and periphery side is controllable by adjusting the include angle theta which a positive pressure generating sections [1st and 2nd /b / 11 / and 11d] longitudinal direction and a direction parallel to the side face of the body 10 of a slider make.
Moreover, surfacing height in case the magnetic head is located in the hoop direction center section of the magnetic disk is controllable by adjusting die-length D from die-length C from the front end of inclined plane 11a to the back end of 1st positive pressure generating section 11b, or the front end of inclined plane 11a to 2nd connection section 11c. Thus, since the profile of a surfacing property is controllable by the structure parameter of a head slider, the flying height of a slider can be stabilized corresponding to the transit conditions of arbitration.
Moreover, since the airstream close side of the 1st negative pressure generating section 16 is closed in the 1st connection section 12, strong negative pressure occurs in this 1st negative pressure generating section 16, and a strong suction force is acquired. In case the effect on the flying height by the difference in elevation of an installation can be reduced, therefore the magnetic head is installed in the location where the altitude is high by this, it can stop that the flying height of a head slider falls.
By furthermore adjusting ten bodies lay length of slider E of the 1st connection section 12, pitch angle alpha of the magnetic head is controllable.
[0029]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the bottom view of an example of the magnetic-head slider concerning this design.
[Drawing 2] It is the perspective view showing the configuration by the side of the base of an example of the magnetic-head slider concerning this design.
[Drawing 3] It is the graph which shows the example of control of the surfacing height in the magnetic-head slider concerning this design.
[Drawing 4] It is the graph which shows the example of control of the surfacing height in the magnetic-head slider concerning this design.
[Drawing 5] It is the sectional view showing an example of the magnetic-core section prepared in the magnetic-head slider concerning this design.
[Drawing 6] It is the fragmentary sectional view showing an example of the magnetic-core section prepared in the magnetic-head slider concerning this design.
[Drawing 7] It is drawing showing the arrangement relation between the general magnetic head and a magnetic disk.
[Drawing 8] It is the side elevation showing the surfacing run state of an example of the conventional magnetic head.
[Drawing 9] It is the rear view showing the surfacing run state of an example of the conventional magnetic head.
[Description of Notations]
10 Body of Slider
11 Side Rail
11b The 1st positive pressure generating section
11c The 2nd connection section
11d The 2nd positive pressure generating section
12 1st Connection Section
30 Magnetic Core

[Translation done.]

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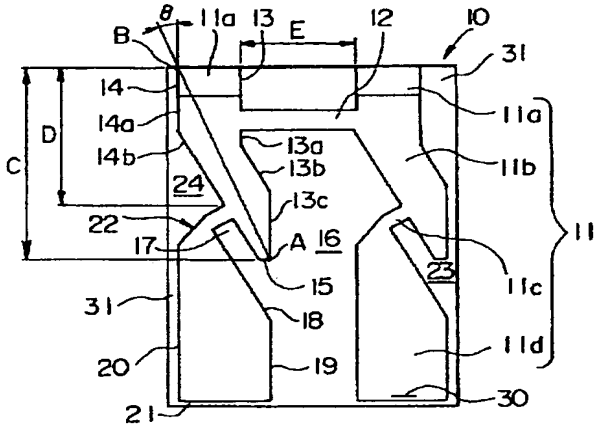
(54)【考案の名称】　磁気ヘッドスライダ

(57)【要約】
【課題】　本考案は、磁気ヘッドが磁気ディスクの内周側や外周側のどの部分に移動しても安定した浮上量を確保できるとともに、標高差の大きな場所に設置された場合であっても浮上走行安定性を十分に安定化でき、適切な浮上量を確保できる磁気ヘッドスライダの提供を目的とする。
【解決手段】　本考案の磁気ヘッドスライダは、板状のスライダ本体10内に磁気ヘッドコア30を備えてなり、スライダ本体10の磁気ディスク側の媒体対向面に複数の正圧発生部11b, 11dを備え、これらの正圧発生部11b, 11dのうちスライダ本体10の前部側の両側縁部に設けられた１対の第１の正圧発生部11bが第１の連結部12によって連結されてこの第１の連結部12の後部側に第１の負圧発生部16を形成しており、かつ第１の正圧発生部11bの長手方向とスライダ本体10の側面と平行な方向とが角度θを有していることを特徴とする。



【実用新案登録請求の範囲】

【請求項１】　板状のスライダ本体内に磁気ヘッドコアを備えてなり、スライダ本体の磁気ディスク側の媒体対向面に複数の正圧発生部を備え、該正圧発生部のうちスライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部が第１の連結部によって連結されて該第１の連結部の後部側に第１の負圧発生部を形成しており、かつ前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とが角度を有していることを特徴とする磁気ヘッドスライダ。

【請求項２】　前記複数の正圧発生部が、スライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部と、スライダ本体の後部側の両側縁部に設けられた１対の第２の正圧発生部とからなることを特徴とする請求項１記載の磁気ヘッドスライダ。

【請求項３】　スライダ本体の両側縁部に沿って隣り合う第１の正圧発生部と第２の正圧発生部とが第２の連結部によってそれぞれ連結されていることを特徴とする請求項２記載の磁気ヘッドスライダ。

【請求項４】　前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とがなす角度が５～６０度であることを特徴とする請求項１～３のいずれかに記載の磁気ヘッドスライダ。

【図面の簡単な説明】

【図１】　本考案に係る磁気ヘッドスライダの一例の底面図である。

【図２】　本考案に係る磁気ヘッドスライダの一例の底面側の形状を示す斜視図である。

【図３】　本考案に係る磁気ヘッドスライダにおける浮上高さの制御例を示すグラフである。

【図４】　本考案に係る磁気ヘッドスライダにおける浮上高さの制御例を示すグラフである。

【図５】　本考案に係る磁気ヘッドスライダに設けられた磁気コア部の一例を示す断面図である。

【図６】　本考案に係る磁気ヘッドスライダに設けられた磁気コア部の一例を示す部分断面図である。

【図７】　一般的な磁気ヘッドと磁気ディスクの配置関係を示す図である。

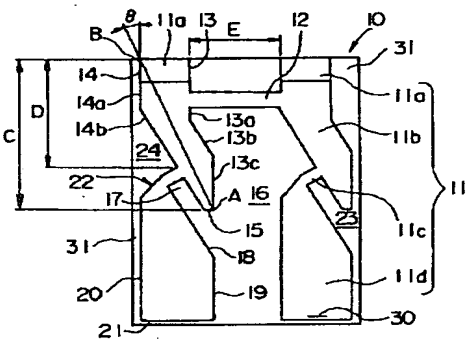
【図８】　従来の磁気ヘッドの一例の浮上走行状態を示す側面図である。

【図９】　従来の磁気ヘッドの一例の浮上走行状態を示す背面図である。

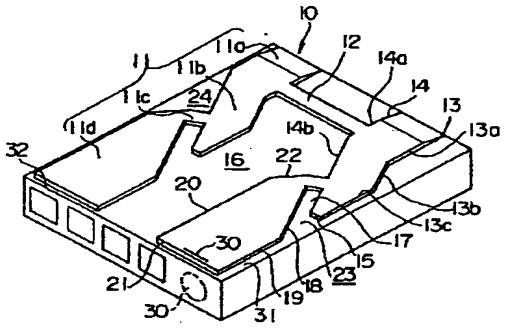
【符号の説明】

１０　スライダ本体
１１　サイドレール
１１ｂ　第１の正圧発生部
１１ｃ　第２の連結部
１１ｄ　第２の正圧発生部
１２　第１の連結部
３０　磁気コア

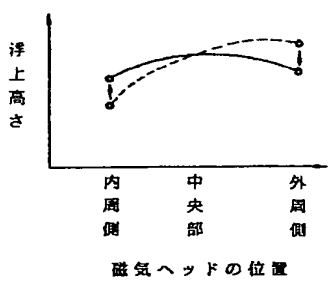
【図１】



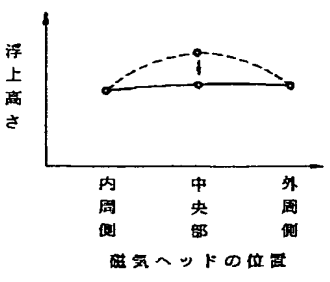
【図２】



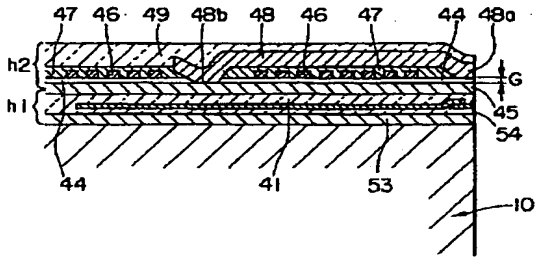
【図３】



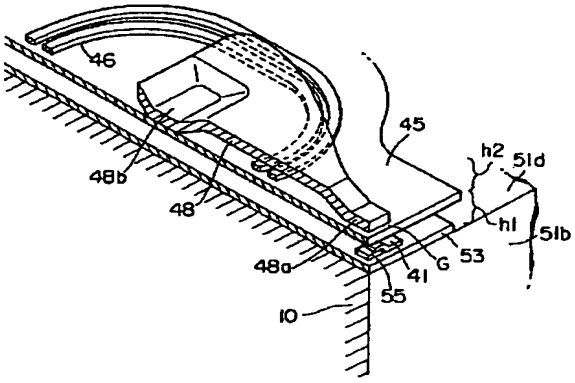
【図４】



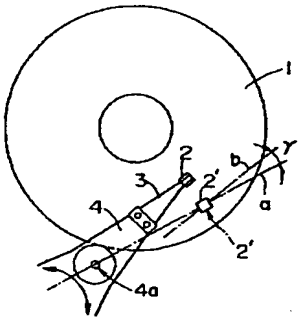
【図５】



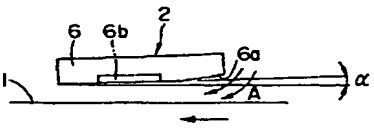
【図６】


46
45
h2
51d
48b
48
h1
51b
48a
G
53
41
55
10

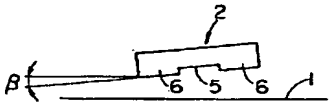
【図７】


1
2
3
2'
b
γ
a
4
2'
4a

【図８】


6
6b
2
6a
A
α
1

【図９】


2
β
6
5
6
1

【考案の詳細な説明】

【０００１】

【考案の属する技術分野】

この考案は磁気記録媒体上を微小間隔で浮上して磁気情報の記録再生を行う磁気ヘッドスライダに関し、特に浮上特性を安定化できるようにした磁気ヘッドスライダに関する。

【０００２】

【従来の技術】

従来、コンピュータ用の磁気記録装置において、図７に示すような磁気ディスク装置が知られている。

この磁気ディスク装置は、回転自在に設けられた円盤状の磁気ディスク１上に磁気ヘッド２が対向配置された構成であり、磁気ヘッド２は３角形状のバネ板３を介して支持アーム４により支持されていて、支持アーム４の回動中心部４ａを中心とする回動操作により磁気ヘッド２が磁気ディスク１の直径方向の所望の位置に移動できるように構成されている。

【０００３】

図７に示す構成の磁気ディスク装置において、磁気ディスク１が停止している場合、磁気ヘッド２の底面は磁気ヘッド２を支持するバネ板３の付勢力によって磁気ディスク１に軽く押し付けられており、磁気ディスク１が回転されている場合は、回転に伴って生じる空気の流れを利用して磁気ヘッド２は磁気ディスク１上を所定の高さで浮上走行するように構成され、磁気ディスク１の回転が停止されると浮上走行していた磁気ヘッド２は再び磁気ディスク１に接触して停止される。そして、前記の浮上走行時に磁気ディスク１の磁気記録層に対して磁気情報の読み書きがなされるように構成されており、この一連の作動状況は通常ＣＳＳ（コンタクトスタートストップ）と称されている。

【０００４】

図８と図９は現在広く使用されている２レール型の磁気ヘッド２の浮上走行状態を示すもので、この磁気ヘッド２の底面には、中央部に１本の溝５を形成してその両側にサイドレール６、６が形成され、各サイドレール６の先端下面側（磁

気ディスク１の回転方向上流側）には、傾斜面６ａが形成されていて、この傾斜面６ａを介して図８の矢印Ａに示すように空気が流入することで磁気ヘッド２のサイドレール６の底面が正圧発生部となって磁気ヘッド２が浮上走行するようになっている。

また、図８の２点鎖線で示すようにサイドレール２の底面に負圧溝６ｂを形成し、この負圧溝６ｂで発生させた負圧と前記サイドレール６、６で発生させた正圧およびばね圧を均衡させることにより浮上走行性の安定化を図った磁気ヘッドの構成も知られている。

【０００５】

ところで、図８は磁気ヘッド２を側面側から見た状態、図９は磁気ヘッド２を後部側から見た状態を示すが、磁気ヘッド２が浮上走行している場合は、傾斜面６ａを介して空気が磁気ヘッド２の底面側に流れ込むため、磁気ヘッド２は図８に示すように空気流入側を上に持ち上げた状態で微小角度傾斜しながら浮上走行しており、一般にこの傾斜角度はピッチ角（α：通常１００～５００μＲａｄ程度）と称されている。また、図９に示すように浮上走行状態の磁気ヘッド２を後部から見た場合に、磁気ヘッド２が左右に傾斜する角度はロール角（β）と称されている。

一方、支持アーム４の回動により図７の符号２'で示すような位置に磁気ヘッド２が移動した場合、磁気ヘッド２の中心線（磁気ヘッド２の中心部を通って磁気ヘッド２の側面と平行な線）ａと、磁気ヘッド２の中心線部分を通過する磁気ディスク２の接線ｂとは一致しないことになるが、この場合の角度ずれはスキュー角（γ）と称されている。

そして、ピッチ角とロール角とが走行安定性の１つの目安として用いられている。

【０００６】

以上のような構成の磁気ヘッド２にあっては、磁気記録の面から見ると磁気ヘッド２が磁気ディスク１の磁気記録層に接近した方が有利であるので、浮上走行時の高さをできる限り低くすることが望ましく、浮上走行性の安定化および信頼性の面から見ると磁気ディスク１上の塵埃等の微細な異物に磁気ヘッド２が衝突

しないようにする必要があるので、浮上走行時の高さをなるべく高くすることが望ましいというように相反する要求があり、現状ではこの相反する要求の折衷点を取って浮上高さが設定されている。

【０００７】

ところが、磁気ディスク１において、その内周部側と外周部側では周速が異なり、磁気ヘッド２の底部側に流れ込む空気量も異なるために、磁気ヘッド２の浮上高さは磁気ディスク１の内周側と外周側で異なることになる。しかも、支持アーム４の回動により、磁気ヘッド２のスキュー角γは磁気ディスク２の内周側と外周側で異なるので、磁気ヘッド２の２本のサイドレール６で発生する正圧が異なるようになり、これらが複合的に影響して磁気ヘッド２のギャップ浮上量、ピッチ角αとロール角βが不安定になる問題がある。

【０００８】

以上のような背景から、磁気ヘッド２のスキュー角γが変化した場合であっても、即ち、磁気ヘッドが磁気ディスクの内周側や外周側のどの部分に移動してもピッチ角やロール角に影響が少なく、安定した浮上量を確保できる磁気ヘッドを開発することが望まれているが、従来のサイドレール６を２本を有する構造の磁気ヘッド２にあっては、スキュー角の変化に対して浮上量やロール角、ピッチ角が敏感に変化する欠点があった。

【０００９】

そこで、従来、サイドレールを主とする正圧発生部の他に、磁気ヘッドの底面中央側にＵ字状のレール部や溝等を形成して負圧発生部を形成し、正圧と負圧のバランスを巧みにとって浮上走行状態を安定化しようとした構造の磁気ヘッドが知られている。

この種の磁気ヘッドは、特開平６－４４７１９号公報、特開平６－１２４５６２号公報、特開平６－１９５９１６号公報、特開平６－２１５５１６号公報などに見ることができる。

ところが、これらの特許に係る磁気ヘッドにあっても、例えば、磁気ヘッドを設ける場所の気圧が低い場合、即ち、設置場所の標高差の影響により低圧状態で使用される場合において走行安定性に不足を生じるおそれがあった。

【００１０】

【考案が解決しようとする課題】

本考案は前記事情に鑑みてなされたものであり、磁気ヘッドが磁気ディスクの内周側や外周側のどの部分に移動しても安定した浮上量を確保できるとともに、標高差の大きな場所に設置された場合であっても浮上走行安定性を十分に安定化でき、適切な浮上量を確保できる磁気ヘッドスライダを提供することを目的とする。

【００１１】

【課題を解決するための手段】

前記課題を解決するために本考案の磁気ヘッドスライダは、板状のスライダ本体内に磁気ヘッドコアを備えてなり、スライダ本体の磁気ディスク側の媒体対向面に複数の正圧発生部を備え、該正圧発生部のうちスライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部が第１の連結部によって連結されて該第１の連結部の後部側に第１の負圧発生部を形成しており、かつ前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とが角度を有していることを特徴とする。

前記複数の正圧発生部は、スライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部と、スライダ本体の後部側の両側縁部に設けられた１対の第２の正圧発生部とで好ましく構成することができる。

そしてスライダ本体の両側縁部に沿って隣り合う第１の正圧発生部と第２の正圧発生部とが第２の連結部によってそれぞれ連結されていてもよい。

また前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とがなす角度は５～６０度であることが好ましい。

【００１２】

【考案の実施の形態】

以下、図面を参照して本考案の実施例について説明する。

図１と図２は本考案に係る磁気ヘッドスライダの実施例を示すもので、この例の磁気ヘッドスライダは板状のスライダ本体１０に、後述する構成の磁気コア３０を備えたものである。スライダ本体１０の磁気コア３０部分以外の部分は全体

的にはセラミックス製などの基板から構成されてなり、図７に示す従来の磁気ヘッドと同様に使用されるものである。

前記スライダ本体１０の底面（図１と図２では上面であって、磁気ディスクに対向する媒体対向面）には、その両側縁部に位置してスライダ本体１０の前部側から後部側に至る２本のサイドレール１１，１１がされている。

なお、本明細書では、図１におけるスライダ本体１０の上側をスライダ本体１０の前部側と称し、この前部側が一般にはスライダのリーディング側と称されて磁気ディスクからの空気流が流入される側であり、反対に、図１におけるスライダ本体１０の下側をスライダ本体１０の後部側と称し、この後部側が一般にはスライダのトレーリング側と称されて磁気ディスクからの空気流が流出される側である。

【００１３】

本実施例において、２本のサイドレール１１，１１は同じ平面形状に形成され、第１の連結部１２によって連結されている。これらのサイドレール１１，１１の形状は異なっていてもよい。

各サイドレール１１，１１は、スライダ本体１０の前部側に形成された傾斜面１１ａと、この傾斜面１１ａから後部側へ連続してスライダ本体１０のほぼ中央部まで伸びる第１の正圧発生部１１ｂと、スライダ本体１０のほぼ中央部から後部側にかけて位置する第２の正圧発生部１１ｄと、第１の正圧発生部１１ｂと第２の正圧発生部１１ｄとを連結する第２の連結部１１ｃとからなっている。

サイドレール１１，１１は、スライダ本体１０の両側端縁よりも内側に形成され、サイドレール１１の側方外側には段部３１が形成されている。またサイドレール１１，１１の後端は、スライダ本体１０の後部端縁よりも内側に形成され、サイドレール１１の後方外側には段部３２が形成されている。

【００１４】

傾斜面１１ａは矩形状に形成されている。第１の正圧発生部１１ｂの平面形状は、傾斜面１１ａのスライダ本体１０の側面に平行な２辺１３，１４のうちの一辺１３を後部側に延長してなる延長線分部１３ａと、これに続いて後部側斜め方向に延びる斜め線分部１３ｂと、これに続いて後部側へスライダ本体１０の側面

に平行に延びる平行線分部１３ｃと、前記傾斜面１１ａの他方の辺１４を後部側に延長してなる延長線分部１４ａと、これに続いて後部側へ前記斜め線分部１３ｂと平行に延びる斜め線分部１４ｂと、スライダ本体１０の端面に平行な後端線分部１５とで囲まれた形状となっている。

【００１５】

また第２の正圧発生部１１ｄは、第１の正圧発生部１１ｂの後部側に等幅の溝部１７を介して形成されており、その平面形状は、第１の正圧発生部１１ｂの斜め線分部１４ｂに平行な斜め線分部１８と、第１の正圧発生部１１ｂの平行線分部１３ｃの延長上に位置する直線部１９と、第１の正圧発生部１１ｂの延長線分部１４ａの延長上に位置する直線部２０と、スライダ本体１０の端面に平行な後端線分部２１とからなる台形の、前部側先端部を直線部２０に対して斜めに切り欠いて切欠部２２が形成された形状となっている。

【００１６】

そして、スライダ本体１０の両側縁部に形成されている一対の第１の正圧発生部１１ｂ，１１ｂが、これらの内側の延長線分部１３ａ，１４ａ上で第１の連結部１２によって連結されており、この第１の連結部１２の後部側に第１の負圧発生部１６が形成されている。このように第１の負圧発生部１６の前部側（空気流入側）を第１の連結部１２で閉じた構成とすることにより、この第１の負圧発生部１６で発生する負圧を大きくすることができる。

【００１７】

また本実施例においては、第２の正圧発生部１１ｄの前部側先端部と第１の正圧発生部１１ｂとが、矩形状の第２の連結部１１ｃによって連結されている。このように、第１の正圧発生部１１ｂと第２の正圧発生部１１ｄとの間の溝部１７を第２の連結部１１ｃで閉じた構成とすることにより、第１の負圧発生部１６で発生する負圧をさらに大きくすることができる。

またスライダ本体１０の両側縁部に沿って隣り合う第１の正圧発生部１１ｂと第２の正圧発生部１１ｄとの間には、それぞれ第２の負圧発生部２３および第３の負圧発生部２４が形成されている。そして、第１の正圧発生部１１ｂと第２の正圧発生部１１ｄとの間の溝部１７を第２の連結部１１ｃで閉じた構成とするこ

とにより、この第２の連結部１１ｃよりも空気流出側の負圧発生部、すなわち第２の負圧発生部２３で発生する負圧を大きくすることができる。

また第２の連結部１１ｃを設けない構成とすることも可能であり、この場合には、標高差による浮上安定性が若干劣化するものの、設計の自由度が増大する。

【００１８】

ここで本明細書においては、磁気ヘッドスライダの平面図における第１の正圧発生部１１ｂの平行線分部１３ｃと後端線分部１５とが交わる頂点Ａと、この頂点Ａと対角線上に位置する傾斜面１１ａの前端部の頂点Ｂとを結ぶ方向を第１の正圧発生部１１ｂおよび第２の正圧発生部１１ｄの長手方向とする。

本実施例の磁気ヘッドスライダは、前記頂点Ａが頂点Ｂよりも、磁気ディスクの外周側に位置するように配置して用いられる。そして、第１および第２の正圧発生部１１ｂ，１１ｄの長手方向と、スライダ本体１０の側面に平行な方向とがなす角度θを変化させると、スキュー角γに対する浮上高さが変化し易くなり、これにより磁気ヘッドが磁気ディスクの内周側に位置するときの浮上高さ、および外周側に位置するときの浮上高さを的確に調整することができる。例えば図３に示すように、角度θを大きくするほど外周側での浮上高さを低くし、かつ内周側での浮上高さを高くする、すなわち図３中破線で示す状態から実線で示す状態へと変化させることができる。

この角度θは５～６０度、より好ましくは５～３０度の範囲が好ましく、これより小さいと外周側での浮上高さが高くなり過ぎるために好ましくなく、これより大きいと外周側での浮上高さが低くなり過ぎるために好ましくない。角度θは磁気ディスク装置におけるスキュー角γの設定もしくは仕様に応じて適宜設定される。

【００１９】

また、傾斜面１１ａの前端から第１の正圧発生部１１ｂの後端までの、スライダ本体１０の側面に平行な方向における長さＣを変化させることにより、磁気ヘッドが磁気ディスクの周方向中央部に位置するときの浮上高さを変化させることができる。例えば図４に示すように、長さＣを短くするほど中央部での浮上高さを低くする、すなわち図４中破線で示す状態から実線で示す状態へと変化させる

ことができる。

また、傾斜面１１ａの前端から第２の連結部１１ｃまでの、スライダ本体１０の側面に平行な方向における長さＤを変化させることによっても、磁気ヘッドが磁気ディスクの周方向中央部に位置するときの浮上高さを変化させることができる。例えば図４に示すように、長さＤを短くするほど中央部での浮上高さを低くする、すなわち図４中破線で示す状態から実線で示す状態へと変化させることができる。

さらに第１の連結部１２のスライダ本体１０幅方向の長さＥを変化させることによって、磁気ヘッドのピッチ角αを調整することができる。例えばこの連結部１２の長さＥを大きくするほどピッチ角αは小さくなる。

【００２０】

次に、スライダ本体１０の後端部側の外周側に形成された磁気コア３０の構造について説明する。

この例で示す磁気コア３０は、図５と図６に断面構造を示すような複合型磁気ヘッドコアであり、スライダ本体１０の後端面（トレーリング側端面）に、ＭＲヘッド（読出ヘッド）h1と、インダクティブヘッド（書込ヘッド）h2とが順に積層されて構成されている。

【００２１】

ＭＲヘッドh1は、磁気抵抗効果を利用してディスクなどの記録媒体からの漏れ磁束を検出し、磁気信号を読み取るものである。

図５と図６に示すようにＭＲヘッドh1は、スライダ本体１０の後端部に形成されたセンダスト（Ｆｅ-Ａｌ-Ｓｉ）等の磁性合金からなる下部シールド層５３上に、アルミナ（Al_2O_3）などの非磁性材料により形成された下部ギャップ層５４が設けられ、この下部ギャップ層５４上に、磁気抵抗効果材料膜５５が積層されている。

前記巨大磁気抵抗効果材料膜５５の両側には、この膜にバイアス磁界を与えるハードバイアス層や検出電流を与える電極層などが形成され、更にその上には、上部ギャップ層が形成され、その上に上部シールド層が形成されており、この上部シールド層は、その上に設けられるインダクティブヘッドh2の下部コア層４

５と兼用にされている。

【００２２】

インダクティブヘッドｈ2は、下部コア層４５の上に、ギャップ層４４が形成され、その上に平面的に螺旋状となるようにパターン化されたコイル層４６が形成され、コイル層４６は絶縁材料層４７に囲まれている。絶縁材料層４７の上に形成された上部コア層４８は、その先端部４８ａをＡＢＳ面５１ｂにて下部コア層４５に微小間隙をあけて対向し、その基端部４８ｂを下部コア層４５と磁気的に接続させて設けられている。また、上部コア層４８の上にはアルミナなどからなる保護層４９が設けられている。

【００２３】

インダクティブヘッドｈ2では、コイル層４６に記録電流が与えられ、コイル層４６からコア層に記録磁界が与えられる。そして、磁気ギャップＧの部分での下部コア層４５と上部コア層４８の先端部からの漏れ磁界により磁気ディスクなどの磁気記録媒体に磁気信号を記録することができる。

また、ＭＲヘッドｈ1においては、磁気ディスクからの微小の漏れ磁界の有無により磁気抵抗効果材料膜５５の電気抵抗が変化するので、この抵抗変化を読み取ることで磁気ディスクの記録内容を読み取ることができる。

【００２４】

前記の如く構成された磁気ヘッドスライダ１０にあっては、図７に示す従来例の磁気ヘッド２と同様にＣＳＳでもって磁気ディスク１に対して浮上走行し、必要に応じて磁気情報の書き込みと読み込みを行う。

従って、磁気ディスク１が停止している状態においては、磁気ヘッドスライダはそのサイドレール１１の底面を磁気ディスク１の表面にバネ板３の付勢力で軽く押しつた状態で停止している。

【００２５】

この状態から磁気ディスク１が回転を始めると、磁気ディスク表面に気流が生じ、この気流がスライダ本体１０の傾斜面１１ａ、１１ａを介してスライダ本体１０の底面側に流入するようになる。ここで、この気流発生により傾斜面１１ａ、１１ａには揚力が発生するのでこの揚力がバネ板３の付勢力に打ち勝つ大きさ

になるとスライダ本体１０は浮上を始める。また、傾斜面１１ａ、１１ａを通過してスライダ本体１０の底面側に流入した空気と傾斜面１１ａ、１１ａの間の第１の連結部１２を通過した空気は第１の負圧発生部１６に流入し、ここで大きな負圧を発生し、スライダ本体１０は図８に示す磁気ヘッド２と同様に、傾斜面１１ａ側を上に持ち上げた状態で所定のピッチ角αで傾斜する。

【００２６】

また、傾斜面１１ａ、１１ａを通過した空気の一部はサイドレール１１に沿って流れて、第１の正圧発生部１１ｂおよび第２の正圧発生部１１ｄで正圧を発生させるが、傾斜面１１ａ、１１ａを通過して第２の負圧発生部２３に流入した空気は、第２の負圧発生部２３においても負圧を発生させる。また傾斜面１１ａ、１１ａを通過して第３の負圧発生部２４に流入した空気は、第３の負圧発生部２４においても負圧を発生させる。

ここで負圧が、第１の負圧発生部１６とその両側に位置する第２の負圧発生部２３および第３の負圧発生部２４の３カ所において発生すると、スライダ本体１０に負圧を作用させる位置が３カ所になり、スライダ本体１０を磁気ディスク１側に吸引する力が３カ所で発生するので、スライダ本体１０をバランスの良い吸引力で磁気ディスク１側に吸引できる。また特に第１の負圧発生部１６の空気流入側を第１の連結部１２で閉じたことにより、この第１の負圧発生部１６で強い負圧が発生するので、これによりスライダ本体１０の中央部分を強い吸引力で磁気ディスク側１に吸引できる。従ってスライダ本体１０の浮上安定性を高めることができる。

【００２７】

次に、スライダ本体１０の両側端縁部および後端縁部には、段部３１，３２が形成されているが、これらの段部３１，３２は、何らかの原因によってスライダ本体１０のロール角βが大きくなった場合に、スライダ本体１０の磁気ディスク１に近い側の端縁部が磁気ディスク１に接触することを防止する。また、スライダ本体１が浮上走行を完了した時点においては浮上量を十分に確保できているのでスライダ本体１０の後端部がロールリングにより磁気ディスク１に接触する確率は低いが、ＣＳＳにおいてスライダ本体１０が浮上を開始した時点では浮上量

は小さいので、この際に大きなローリングを生じると磁気ディスク１にスライダ本体１０の後端両縁部を接触させるおそれを生じるが、段部３１を設けておくことで、この問題を低減させることができる。また、段部３１，３２を設けることにより、磁気ヘッドスライダ切断時の誤差により、サイドレール１１を切削してしまうのを防止することができる。

【００２８】

また本実施例の磁気ヘッドスライダによれば、第１および第２の正圧発生部１１ｂ，１１ｄの長手方向と、スライダ本体１０の側面に平行な方向とがなす角度θを調整することによって、磁気ヘッドが磁気ディスクの内周側に位置するときの浮上高さ、および外周側に位置するときの浮上高さを制御することができる。また、傾斜面１１ａの前端から第１の正圧発生部１１ｂの後端までの長さＣ、または、傾斜面１１ａの前端から第２の連結部１１ｃまでの長さＤを調整することによって、磁気ヘッドが磁気ディスクの周方向中央部に位置するときの浮上高さを制御することができる。このように、ヘッドスライダの構造パラメータによって浮上特性のプロファイルを制御できるので、任意の走行条件に対応してスライダの浮上量を安定化することができる。

また、第１の負圧発生部１６の空気流入側が第１の連結部１２で閉じられているので、この第１の負圧発生部１６で強い負圧が発生し、強い吸引力が得られる。これにより、設置場所の標高差による浮上量への影響を低減することができ、したがって磁気ヘッドを標高が高い場所に設置する際にヘッドスライダの浮上量が低下するのを抑えることができる。

さらに第１の連結部１２のスライダ本体１０幅方向の長さＥを調整することによって、磁気ヘッドのピッチ角αを制御することができる。

【００２９】

【考案の効果】

以上説明したように本考案の磁気ヘッドスライダは、板状のスライダ本体内に磁気ヘッドコアを備えてなり、スライダ本体の磁気ディスク側の媒体対向面に複数の正圧発生部を備え、該正圧発生部のうちスライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部が第１の連結部によって連結されて該第１の

連結部の後部側に第１の負圧発生部を形成しており、かつ前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とが角度を有していることを特徴とするものである。

従って、第１の負圧発生部で大きな負圧が得られ、これにより磁気ヘッドを標高差の大きな場所に設置する場合であっても適切な浮上量を確保できて安定した走行状態を得ることができる。

また第１の正圧発生部とスライダ本体の側面と平行な方向とがなす角度を調整することによりヘッドスライダの浮上特性プロファイルを制御することができるので、磁気ディスクの内周側あるいは外周側で磁気ディスクの周速が異なり、スライダ本体の底部側に流入する空気量が多少異なることや、スキュー角が変化することに起因する浮上量の変化を抑えて、スライダ本体の浮上量を安定化でき、浮上走行状態を安定化できる磁気ヘッドスライダを提供できる。

【００３０】

前記構成において、複数の正圧発生部が、スライダ本体の前部側の両側縁部に設けられた１対の第１の正圧発生部と、スライダ本体の後部側の両側縁部に設けられた１対の第２の正圧発生部とからなる構成とすれば、浮上量の制御が容易となる。

またスライダ本体の両側縁部に沿って隣り合う第１の正圧発生部と第２の正圧発生部とが第２の連結部によってそれぞれ連結されている構成とすれば、負圧が大きくなり、標高差の影響を低減できる。

さらに前記第１の正圧発生部の長手方向とスライダ本体の側面と平行な方向とがなす角度を５～６０度とすれば、内周から外周に渡って浮上量を一定にすることができる。